

mainland. Dr. H. Schenck is responsible for the account of the Canary Islands, as he was for the previous numbers referring to the islands of Kerguelen, St. Paul, and New Amsterdam; but much of the text and a few of the illustrations are again the work of the late Prof. A. F. W. Schimper, who was botanist to the expedition. The character sketches written by Prof. Schimper bear that particularly vivid impress and breadth of view that characterise "Die Pflanzen-geographie." Certainly he has a most fascinating subject, as the flora of the islands is rich in curious endemic plants.

The zones of vegetation as developed on the island of Teneriffe are fairly typical for the group. Schimper distinguishes three regions, basal, montane, and alpine. The basal region is the most extensive; here are found the weird arboreal monarch of the island, *Dracaena Draco*, the dragon's blood tree, showing at first an unbranched stem with tiers of horizontal leaves, but developing later a much-branched system; the candelabra-like *Euphorbia canariensis* and a date palm, *Phoenix Jubae*, the fruits of which provide food for birds but not for man. These are the dominant endemic species, but there are many others, succulent species of *Euphorbia*, *Ceropegia*, *Echium*, &c., and xerophytes characterised by a mass of thin, whip-like branches and narrow leaves, of which *Plocama pendula* furnishes a type. The proportion of endemics in the coastal vegetation is about one-third, a large number being species of *Statice*.

In the montane region Schimper notes particularly the laurel forest, where *Laurus canariensis*, *Erica arborea*, *Ilex canariensis*, and *Ocotea bullata* hold sway. Great interest attaches to several of these, because they are evidently closely connected with Tertiary fossil forms found in European countries. *Pinus canariensis* gives character to the landscape at 5000 feet, while higher *Spartocytisus supranubius* is almost the sole occupant of the black, stoney slopes. The volume is altogether *un embarrass de richesse*, with copious illustrations, some in heliogravure, others interspersed with the text. Not the least pleasing feature is the generous manner in which Dr. Schenck has subordinated his work to that of his former colleague.

The study of phytoplankton is, for obvious reasons, a more exclusive subject, but the results given in the two volumes of text and plates are full of interest. Two earlier accounts treated of the gatherings taken in the Antarctic and Atlantic, while the plankton of the Indian Ocean is here under discussion. It was found that a definite limit to the Antarctic region could be set at Kerguelen Island. As the ship proceeded northwards the character of the plankton changed, species of *Ceratium* and *Peridineæ* generally becoming more numerous. Off Sumatra an increase of diatoms and *Schizophyceæ* connected with the increased food supply furnished evidence of coastal plankton mixed with the oceanic forms. Respecting vertical distribution, it was noted that in tropical waters the mass of plankton exists in the upper six hundred feet, while at twelve hundred feet living forms practically cease. The morphological details at the end of the volume

include notes on diatom microspores, the formation of the rays in certain of the *Peridineæ*, and some life-histories. A final word of commendation must be bestowed on the volume of exceptionally fine drawings that have been skilfully reproduced.

SOME NEW CHEMICAL BOOKS.

- (1) *A Systematic Introduction to Analytical Chemistry*. By A. F. Walden and B. Lambert. Pp. vi+176. (Oxford: J. Thornton and Son, 1908.) Price 3s. 6d.
- (2) *Naturlehre für höhere Lehranstalten*. I. Teil. Chemie, Mineralogie, und Geologie. By Dr. F. Dannemann. Pp. viii+225. (Hanover and Leipzig: Hahnsche Buchhandlung, 1908.) Price 2.80 marks.
- (3) *Organic Chemistry*. Including certain portions of Physical Chemistry for Medical, Pharmaceutical, and Biological Students. By H. D. Haskins and J. J. R. Macleod. Pp. xi+367. (New York: J. Wiley and Sons; London: Chapman and Hall, Ltd., 1907.) Price 8s. 6d. net.
- (4) *Stereochemie, die Lehre von der Räumlichen Anordnung der Atome im Molekül*. By Dr. L. Mamlock. Pp. vi+152. (Leipzig: B. G. Teubner, 1907.) Price 5 marks.

(1) **ALTHOUGH** there is perhaps no branch of chemistry which at the present day is more stagnant than analysis (of the academic as distinguished from the technical kind), there are always to be found teachers whose interest in the subject will prompt them to publish their experiences. With this interest we have the greatest sympathy, for there is no doubt that the skill, neatness, intelligence and patience which analysis demands will always appeal to the chemist. Analysis is, in fact, his handicraft, just as much as the using of a lathe or a planing machine is that of the mechanical engineer, with this difference: that whilst the engineer may employ a mechanic to do his practical work, the chemist must always be his own analyst.

When we approach the question of the place of analysis in chemical teaching, we put the subject at once on a different plane and see it in a different perspective, for as students of chemistry are not all to be professional chemists, we have to consider analysis as merely a part of chemical teaching. There is no doubt that there has been a tendency for the subject to assume an exaggerated value. We inherited the tradition of the Stockholm Laboratory, and continued it because it adapted itself to practical examinations in chemistry. We do not believe any more than the authors "that the neglect of qualitative analysis is either necessary or desirable," but there is a great difference between learning the principles of the process and studying it as a part of the technique of the professional chemist. For the ordinary student there seems no object in discovering and identifying such uncommon combinations as meta- and pyro-phosphoric acid, fluosilicates or perchlorates. The range of practical chemistry has so increased of late that it has become more than ever imperative to restrict the study of one branch if it encroaches on the time which

could be given more usefully to another. As to the general character of the book under review, we have failed to discover anything very original in its treatment of the subject, but it seems to be a thoroughly safe and trustworthy guide.

(2) This volume (the first of two parts) is for use in Realschulen and Gymnasien. It is divided into sections. There is one on descriptive and practical chemistry which covers 100 pages, including ten pages on technical processes, one of forty pages on mineralogy, including eight on crystallography. There are about thirteen pages on geology, three pages describe experiments on vegetable physiology, and the last forty pages are devoted to object lessons on topics which range from Scheele's discovery of oxygen to the growth of coral islands. The book is well printed on good paper, illustrated by excellent drawings, and compiled with evident care. It is also, in a sense, a practical manual, the first section being interspersed with a variety of simple chemical experiments. Yet in spite of its attractive appearance it is a satisfaction to think that such a book would find no place in any school in this country. Its defect is diffuseness, especially in the latter sections. We can form a pretty clear notion of the effect of a course of this kind on an average boy or girl. They would have absorbed a number of scientific names, have formed a hurried acquaintance with different kinds of apparatus, remembered several chemical formulæ; they would describe the six crystallographic systems, and talk about sedimentary and igneous rocks; but their knowledge would be a kaleidoscopic assortment of ideas which could produce no sharp and permanent impression, and would do little to stimulate a living interest in the things about them.

Whatever shortcomings our systems of science teaching may possess, we do not set schoolboys and girls, who are old enough to study science seriously, to nibble at a scientific scrap-heap. They may do that as much as they please out of school, and perhaps the more they do it the better; but in school the process with older children must be methodical and thorough, and not superficial and diffuse, and should leave the boy or girl with a solid foundation to build upon.

(3) The authors state in their preface that "it was with the idea of presenting in the simplest manner the facts of organic and physical chemistry which have an essential bearing on medical science that the present work was written." There is no doubt that in the present state of organic chemistry a process of judicious selection for special needs is not only desirable, but imperative. Like the botanist, one has to transplant typical specimens into trim little beds where they can be examined individually without the brain becoming bewildered by an endless and varied flora. Thus the authors have emphasised those facts which have a special relation to physiology and pharmacy, and have suppressed matter which they consider of less importance, and have done it with considerable judgment. Whether they have succeeded as well with the few brief references to physical chemistry is doubtful, the space allotted being altogether inadequate for even an elementary exposition of the subject.

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We would direct the authors' attention to the following errors which have been noted in glancing through the book. Amyl and ethyl nitrite are not usually described as "nitro" compounds (p. 162); no distinction is drawn between the metallic derivatives of glycol and glycollic acid, both being described as *glycolates* (pp. 142 and 166); racemic lactic acid is not indicated by "i," but by "r" (p. 169); *nitrobenzlidene* is wrongly spelt (p. 195); *purine* is not the atomic framework, but the mother-substance of the uric acid group (p. 204); there is a step missing in Traube's synthesis of uric acid (p. 201); and the formula for saffrole is wrong (p. 316).

(4) This book is intended for those who are not professed chemists, but are interested in the related sciences of physics and chemistry. It is a clear and concise exposition of the subject, a sort of abridged Werner's "Lehrbuch," and will no doubt fulfil the purpose for which it was compiled. Satisfactory as the book is in many of its essential features, it reveals a curious ignorance on the part of its author of much of the recent work on stereochemistry published in this country. We have noted the following more important omissions. There is no reference to McKenzie's researches on asymmetric synthesis, or to Patterson's work on the activity of substances in solution, or to his recent paper on "Optical Superposition," or to Kipping's synthesis of optically active silicon compounds. A book which ignores, whether by accident or design, contemporary research cannot be regarded as an entirely trustworthy guide.

J. B. C.

OUR BOOK SHELF.

The Animal Mind. A Text-book of Comparative Psychology. By Dr. Margaret Floy Washburn. Pp. xi+333. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1908.) Price 7s. net.

THIS book is the second volume of a series to be devoted to animal psychology, under the title of "The Animal Behaviour Series." The first volume—"The Dancing Mouse," by Dr. Yerkes, recently reviewed in these pages—was an exposition of the different experimental methods applicable to the investigation of the psychology of one particular animal. Miss Washburn's book likewise follows the experimental method, and aims at presenting concisely the facts and principles that have emerged as the result of the application of this method during the last ten or twenty years to the study of different forms of animal behaviour.

Starting with a general statement of the difficulties and limitations inherent in the science of comparative psychology, the author proceeds to give a somewhat brief yet penetrating and concise discussion of the problem of inferring mind from structure and function respectively. Miss Washburn's conclusion is so typical of her general attitude throughout the book that it may well be quoted here:—"We can say neither what amount of resemblance in structure to human beings, nor what speed of learning constitutes a definite mark distinguishing animals with minds from those without minds, unless we are prepared to assert that only animals which learn so fast that they must have memory ideas possess mind at all. And this would conflict with the argument from structure. For example, there is no good experimental evidence